

Service Service Service

LPL (LG Philips) LCD 2k7

LC260WX2

LC320W01

LC320WX2

LC420WU2

LC420WX2, LC420WX3, LC420WX5

LC470WU1, LC470WU4

Service Manual

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Subject to modification

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PHILIPS

1. Technical Specifications, Connections, and Chassis Overview

Index of this chapter:

- 1.1 Introduction
- 1.2 General
- 1.3 Specifications

Note:

- Specifications are indicative (subject to change).

1.1 Introduction

In this Service Manual you will find all necessary information to perform the Board Level Repair (= board swap) scenario on LCD panels. These LCD repair manuals are created per brand, and they will contain all necessary information for the different panels used in Philips flat LCD TVs.

1.2 General

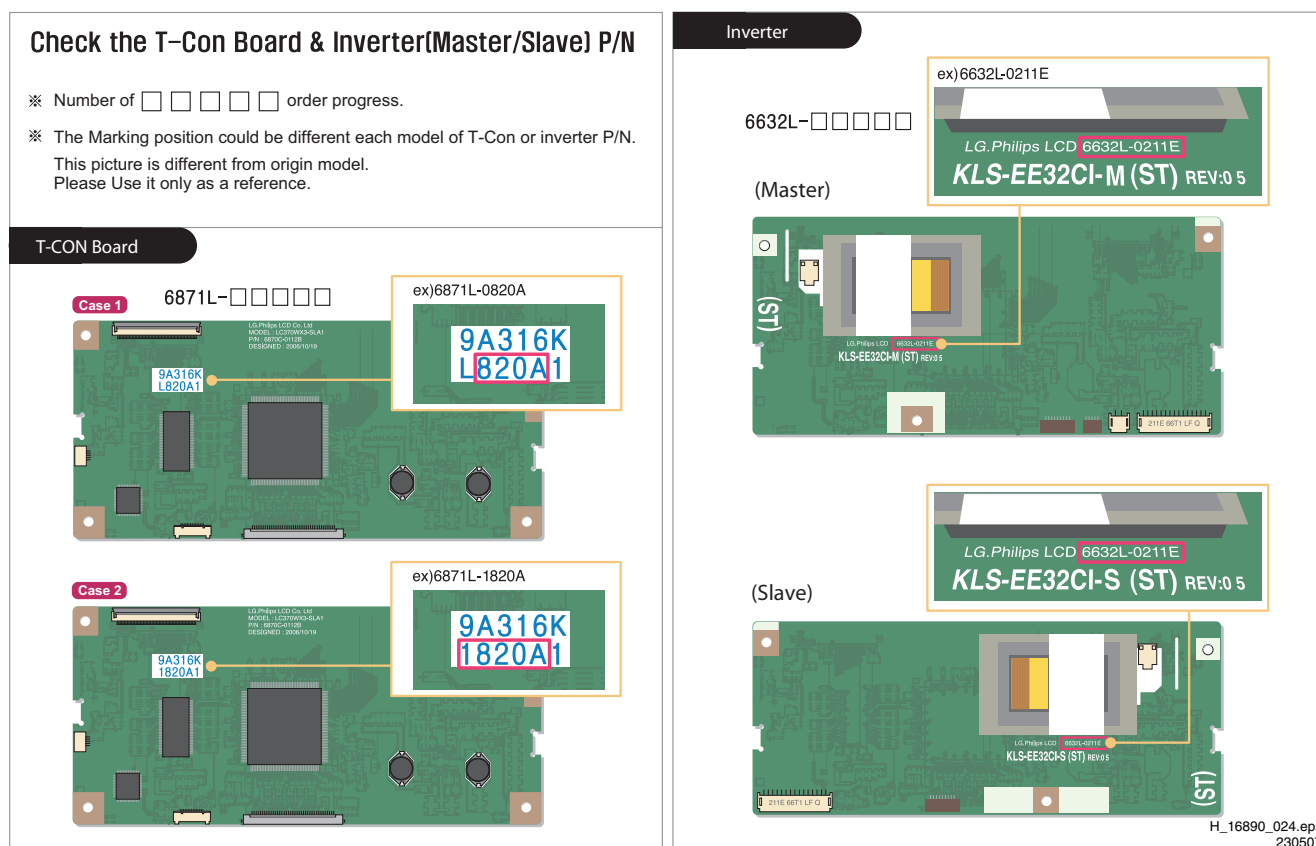


Figure 1-1 LPL board labelling

1.3 Specifications

Below find attached the data sheets of the different LCD panels. Click on the "model number" to open.

- Model LC260WX2
- Model LC320W01
- Model LC320WX2
- Model LC420WU2
- Model LC420WX2
- Model LC420WX3
- Model LC420WX5
- Model LC470WU1
- Model LC470WU4

2. Safety Instructions, Warnings, and Notes

Index of this chapter:

- 2.1 General
- 2.2 Safety Precautions
- 2.3 Servicing Precautions

2.1 General

Notes:

- Only authorised persons should perform servicing of this module.
- When using/handling this unit, pay special attention to the LCD Module: it should not be enforced into any other way than next rules, warnings, and/or cautions.
- **"Warning"** indicates a hazard that may lead to death or injury if the warning is ignored and the product is handled incorrectly.
- **"Caution"** indicates a hazard that can lead to injury or damage to property if the caution is ignored and the product is handled incorrectly.

2.2 Safety Precautions

2.2.1 Warning

- Do not supply a voltage higher than specified to this product. This may damage the product or can create hazardous situations.
- Do not use this product in locations where the humidity is extremely high, where it may be splashed with water, or where flammable materials surround it.
- Do not install or use the product in a location that does not satisfy specified environmental conditions. This may damage the product or can create hazardous situations.
- If a foreign substance (such as water, metal, or liquid) gets inside the product, immediately turn "OFF" the power. Continuing to use the product may cause electric shock or can create hazardous situations.
- If the product emits smoke and abnormal smell, or makes an abnormal sound, immediately turn "OFF" the power. Continuing to use the product may cause electric shock or can create hazardous situations.
- Do not (dis)connect the connector while power to the product is "ON". It takes some time for the voltage to drop to a sufficiently low level after the power has been turned "OFF". Confirm that the voltage has dropped to a safe level before (dis)connecting the connector.
- Do not pull out or insert the power cable from/to an outlet with wet hands. It may cause electric shock.
- If the power cable is damaged, or if the connector is loose, do not use the product, otherwise, this can lead to hazardous situations or may cause electric shock.
- The LCD Backlight Inverter unit uses a high voltage for the lamps. Keep the cautions concerning electric shock and do not touch the device circuitry handling the inverter unit. And because the capacitors of the device circuitry may remain charged at the moment of Power "OFF", standing for 1 minute is required in order to discharge the device circuitry.

2.2.2 Caution

- Do not place this product in a location that is subject to heavy vibration, or an unstable surface such as an inclined surface. The product may fall off or fall over, causing injuries.
- Before disconnecting cable from the product, be sure to turn off the power. Be sure to hold the connector when disconnecting cables. Pulling a cable with excessive force may cause the core of the cable to be exposed or break the cable, and this can lead to fire or electric shock.

- This product contains glass. If shock, vibration, heat or distortion is applied to the product, the glass may be broken.
- If glass surface of the display breaks or is scratched, do not touch the broken pieces or the scratched with bare hands. You may be injured.
- LCD Module requires to be handled with special care. LCD Module is not to be touched with metal or hard materials. Must not be stressed by heat or mechanical impact.
- There are some particular components on the rear panel of this product. Skin contact with these components may cause an electric shock. So, handle with care.
- While moving the product, be sure to turn off the power, disconnect all cables and watch your step. Dropping the product may cause injuries from electric shock. So, while moving the product handle with care.
- When cleaning the panel is necessary, wipe it with a soft and moistened cloth a neutral detergent. Caution on connector area. Do not use chemicals such as thinner or benzene.
- LCD Module emits heat from the Lamp, Backlight lamp, and component parts. Therefore, the environmental temperature must not exceed 50 deg. C. LCD Module Backlight Inverter system is driven by high voltage, so it must avoid conductive materials.
- If repairing components with a lead line, high voltage or high temperature components must be put out from a lead line and fix.
- Do not place an object on the surface of the display. The glass may break or be scratched.
- This product may be damaged if it is subject to excessive stresses (such as excessive voltage, current, or temperature). The absolute maximum ratings specify the limits of these stresses.
- Do not cover or wrap with any covering materials while power is applied to the product.
- This product is made from various materials such as glass, metal, and plastic. When discarding it, be sure to contact a purchase place.
- If a discrepancy occurs due to any arbitrary modification or disassembly, supplier is not responsible for function, quality or other items.
- Within the warranty period, general faults may be charged for depending on responsibility for the faults. You handle with care

2.3 Servicing Precautions

A colour TFT LCD Module can easily be damaged by both electrical and mechanical stresses. Users therefore, are requested to follow the "Servicing precautions of colour TFT LCD Module" on the following.

2.3.1 System Assembler

- **Follow the power sequence:** An abnormal power sequence may cause critical malfunction or electrical damage.
- **Prevent physical stress.**
- **Prevent overheat:**
 - High temperatures on the surface of the screen may cause poor quality. Please use the LCD Module on the specified temperatures.
 - Low temperatures (under 10 deg. C) makes the LCD Module respond slowly, make the Backlight worse operated, and will shorten very much the lifetime accordingly.
- **Keep LCD Module dust-free:** The LCD Module is sensitive against dust; it can cause visual or functional problems.

- **Do not touch TCP area:** Do not touch TCP area at any case. It can cause Driver IC cracks, film cracks, etc. The TCP is the weakest point of the LCD Module.
- **Do not pull Backlight wire:** Please do not pull the Backlight wire, as it can cause the wire to become disconnected or damaged.
- **Check the connections of the Inverter & Backlight connectors:** Incomplete connection can cause burnt in Backlight connectors or damage the inverter.
- **Handle with care:**
 - Please do not drop, bend, or hit the LCD Module.
 - Physical stress can cause defects as broken panels.
- **Keep mounting screw length and motor driver's torque:** Strong motor driver's torque can make a mechanical defect on LCD Module. Please keep within the specifications.
- **Do not operate for a long time under the same pattern:** Operating the LCD Module for a long time with the same video pattern can cause image persistence and can eventually damage it.
- **Defective panels must also be handled with care:**
 - To prevent making other defects, please handle the defective LCD Module as a good one.
 - Defective LCD Modules must be repaired.
- **Do not stack LCD Modules:** The LCD Module consists of fragile components such as TCPs or Glasses. Stacking the LCD Modules can cause undesired defects.
- **Do not provide strong pressure at connecting:** Strong pressure can transfer the force to the TCP, which is the weakest part of the LCD Module. It eventually can make the TCP crack or lead to other unexpected defects.
- **Let the Backlight Wire at the backside of the LCD Module:** If let the Backlight wire in front of the LCD Module, the Backlight connector can hurt the surface of the polariser.

- **Never (dis)connect at power "ON":** The LCD Module consists of CMOS components, which are known as weak components against EOS. It can damage the product.
- **Electrostatic discharge can make damage:**
 - Semi-assembled product should be handled with wrist strap.
 - Earth human body when handle the LCD Module.
 - Please do not touch the interface connector pin.

2.3.2 System Assembler/End User

- **Keep clean the surface:**
 - Please wear rubber gloves when you touch the surface of the LCD Module screen.
 - Please use soft and anti-static material with n-Hexane as cleaner.
- **Be careful not to make polariser scratch:**
 - Surface of polariser is soft, so it's easily scratched.
 - Please do not touch, press or rub on polariser surface with materials over HB hardness.
- **Be careful with swift temperature and humidity changes:** Swift temperature and or humidity change can make dew condensation or ice, which can cause non-conformance such as malfunctioning.
- **Keep out of water:**
 - Water on in the LCD Module can cause electrical short or corrosion.
 - Please wipe out or dry water carefully.
- **Keep the LCD Module free from corrosive gasses:** Corrosive gas can chemically damage the polariser and the circuitry parts and eventually will cause defects.
- **Keep the suitable temperature and humidity:** High temperatures and high humidity will shorten the lifetime

3. Directions for Use

Not applicable.


4. Mechanical Instructions

Index of this chapter:

- 4.1 General
- 4.2 Model LC260WX2
- 4.3 Model LC320W01
- 4.4 Model LC320WX2
- 4.5 Model LC420WU2
- 4.6 Model LC420WX2
- 4.7 Model LC420WX3
- 4.8 Model LC420WX5
- 4.9 Model LC470WU1
- 4.10 Model LC470WU4

4.1 General

4.1.1 Warnings

- Figures can deviate due to the different module executions.
- During repair, place the set face down on a soft surface (e.g. on foam bars as mentioned in next paragraph), in order to prevent damaging the display.
Note: With some chassis, it is possible to measure and replace the boards while the TV is still on its stand.
- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD ). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.



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Figure 4-1 ESD wristband

- Be careful during measurements in the high voltage section. Never pull plugs out under operation conditions, just to prevent danger caused by electrical sparks.
- Never replace modules or other components while the unit is switched "on".
- Connectors "to" and "from" the Inverter Boards must be thoroughly connected to avoid any electrical sparks during operation.

4.1.2 Foam Bars

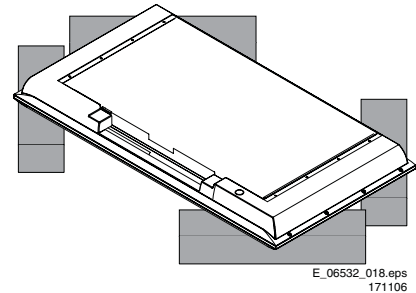
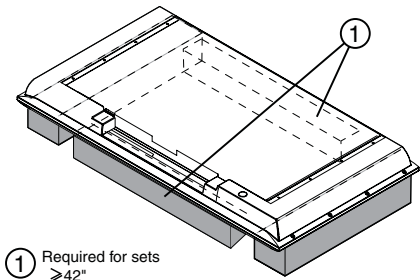


Figure 4-2 Foam bars

The foam bars (order code 3122 785 90580 for two pieces) can be used for all types and sizes of flat displays. See figure "Foam bars" for details. Displays with a size of 42" and larger, require **four** foam bars [1]. Ensure that the foam bars are always supporting the cabinet and **never** only the display.

Caution: Failure to follow these guidelines can seriously damage the display!

By laying the TV face down on the (ESD protective) foam bars, a stable situation is created to perform measurements and alignments. By placing a mirror under the display, you can monitor the screen.

4.1.3 Torque Values

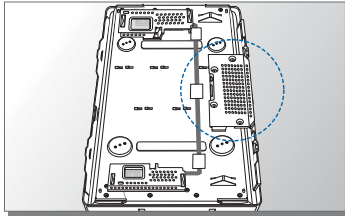
Table 4-1 Recommended Torque Values

| Screw Type (cross head) | Recommended Torque Value |
|-------------------------|--------------------------|
| M2 | 2.0 kg*F ± 0.1 kg*F |
| M2.5 | 3.0 kg*F ± 0.5 kg*F |
| M2.6 | 3.0 kg*F ± 0.5 kg*F |
| M3 | 6.0 kg*F ± 0.5 kg*F |

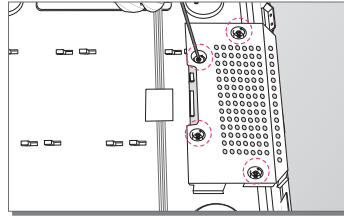
4.2 Model LC260WX2

4.2.1 Control Board (T-CON Board)

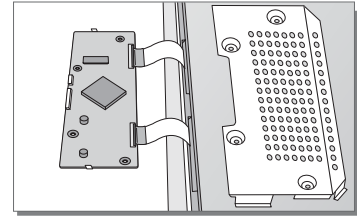
MODEL: LC260WX2-SLB2



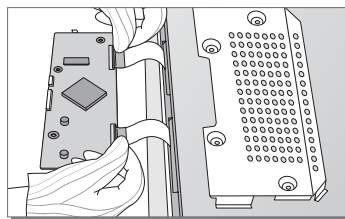
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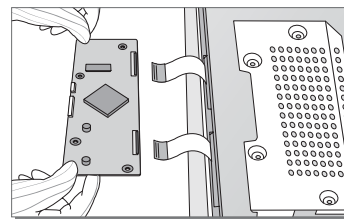
2 Separate the Screw(4EA).



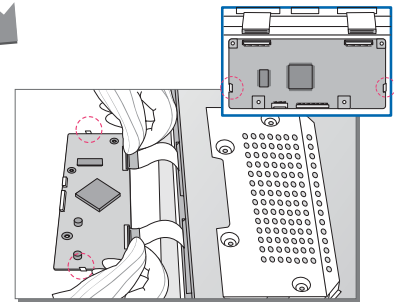
3 Separate the Cover Shield.



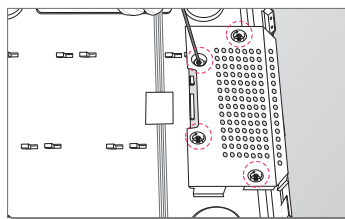
4 Separate the FFC(60pin).



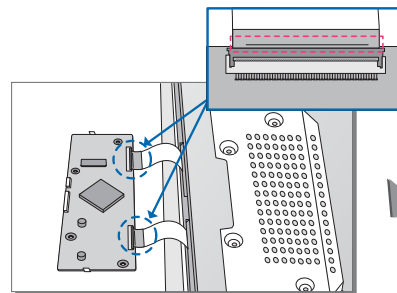
5 Separate the T-CON Board.



6 Replace of T-CON Board and Assemble the FFC(60pin).
* Guide Pin station keeping check.



7 Check the FFC(60pin).



8 Attach the Cover Shield and Assemble the Screw(4EA).

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Figure 4-3 Replacement instructions T-CON board

4.2.2 Inverter (Master) Board

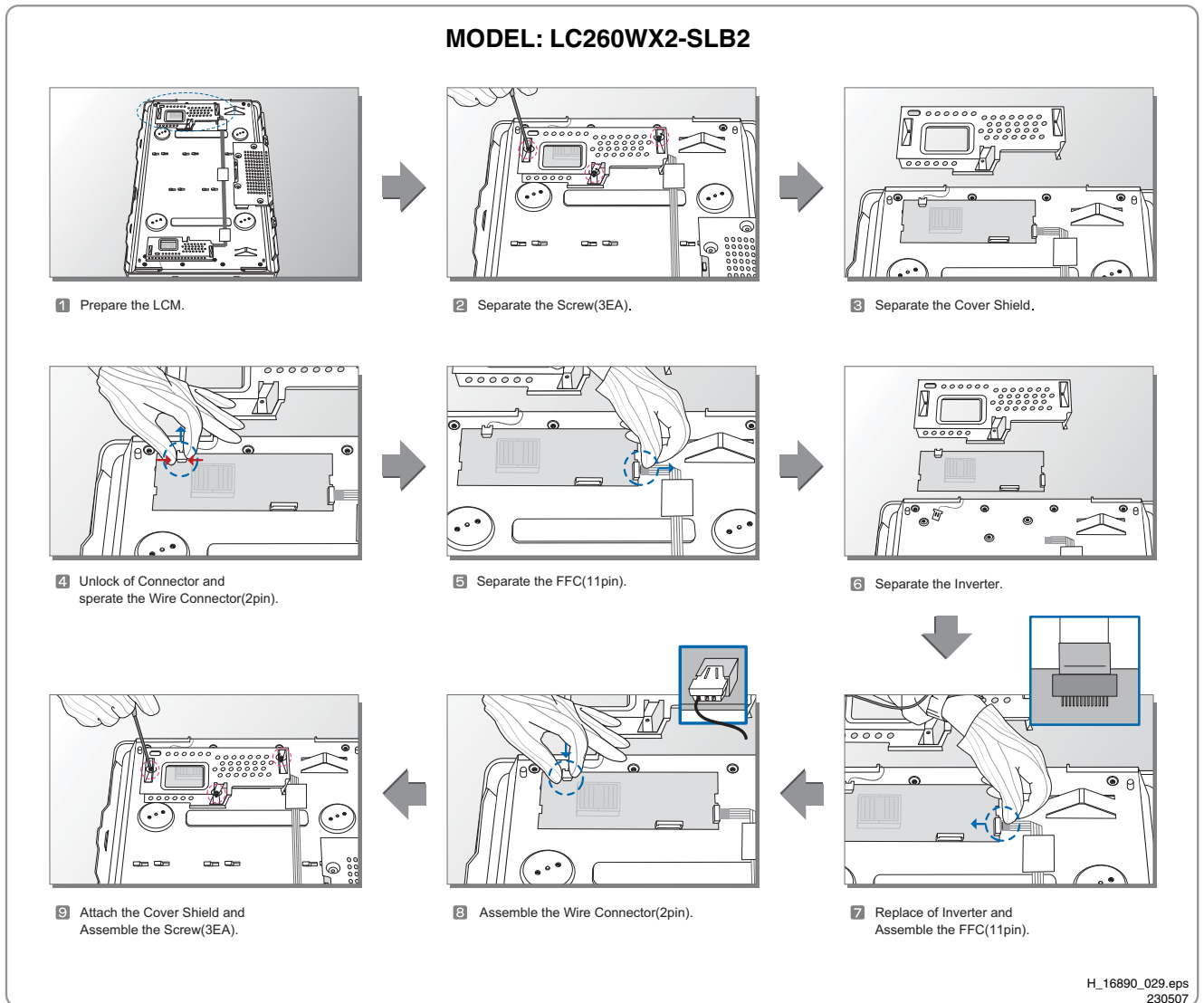
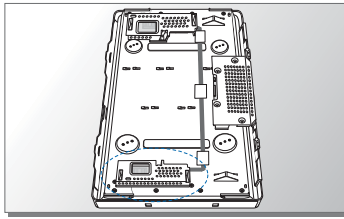


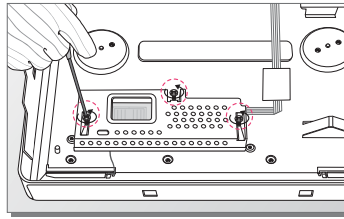
Figure 4-4 Replacement instructions Inverter (master) board

4.2.3 Inverter (Slave) Board

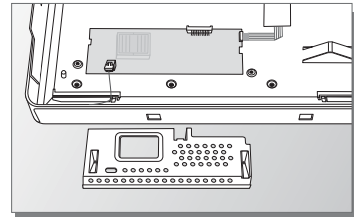
MODEL: LC260WX2-SLB2



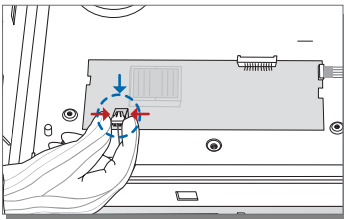
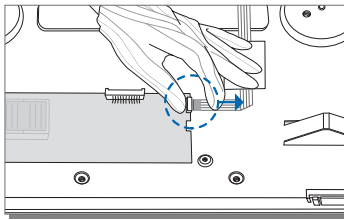
1 Prepare the LCM.



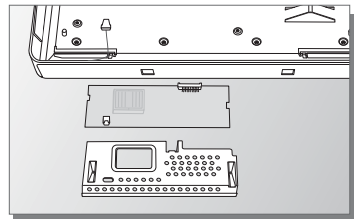
2 Separate the Screw(3EA).



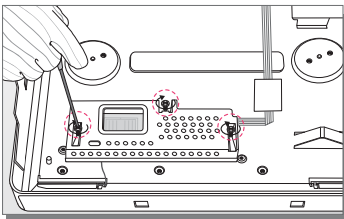
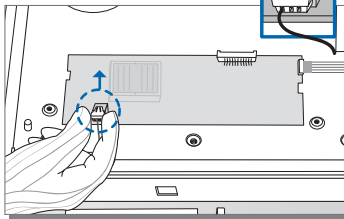
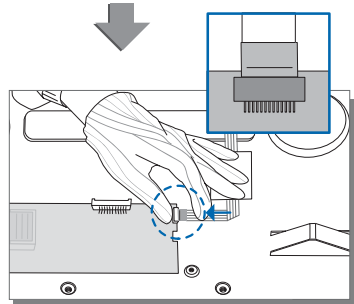
3 Separate the Cover Shield.

4 Unlock of Connector and
separate the Wire Connector(2pin).

5 Separate the FFC(11pin) .



6 Separate the Inverter.

8 Attach the Cover Shield and
Assemble the Screw(3EA).7 Replace of Inverter and
Assemble the FFC(11pin).

9 Assemble the Wire Connector(2pin).

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Figure 4-5 Replacement instructions Inverter (slave) board

4.3 Model LC320W01

4.3.1 Control Board (T-CON Board)

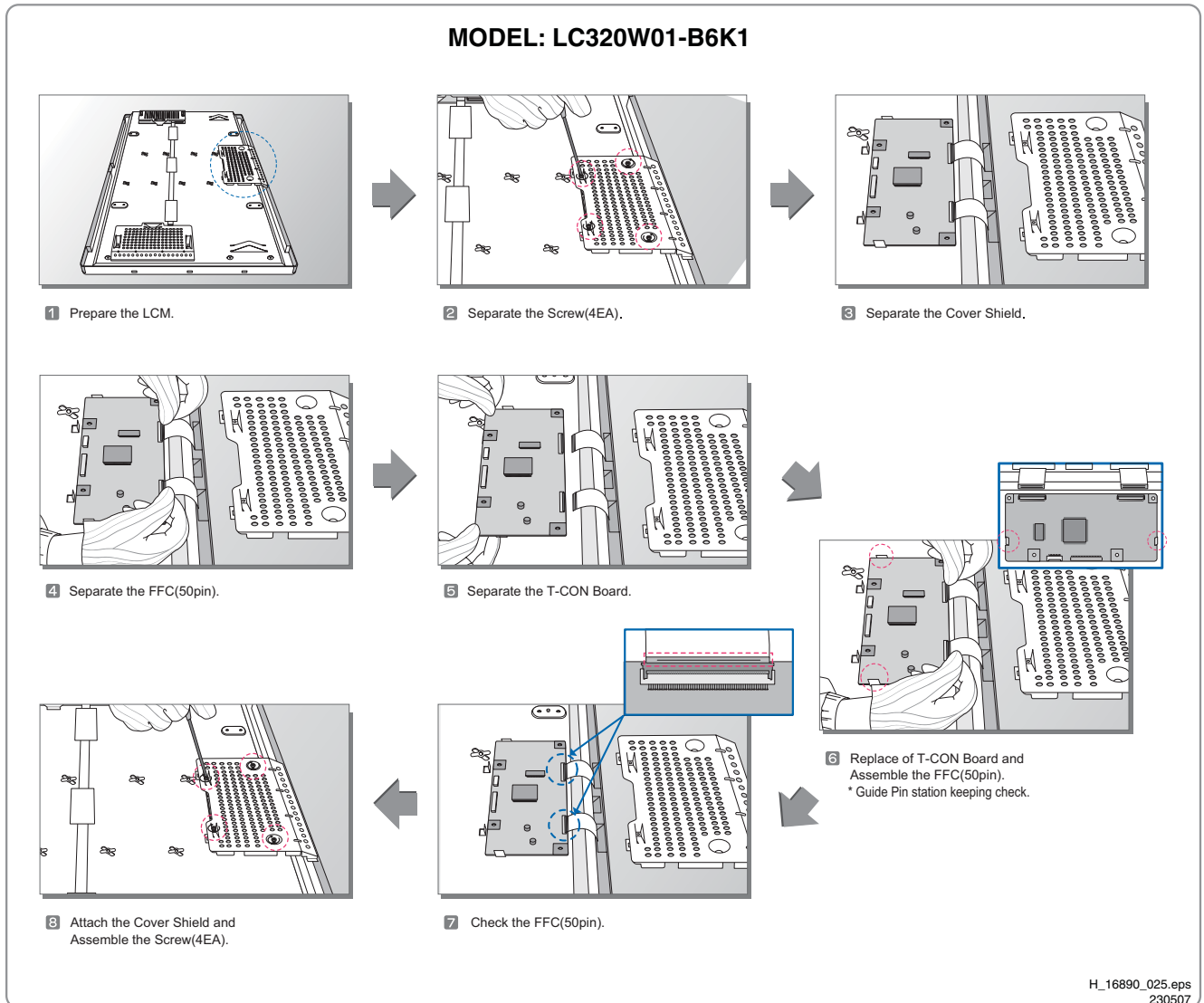
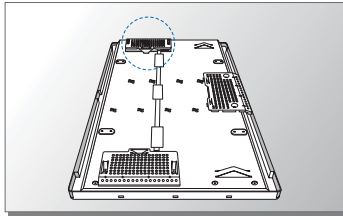


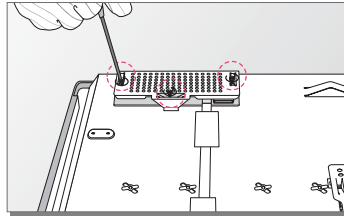
Figure 4-6 Replacement instructions T-CON board

4.3.2 Inverter (Master) Board

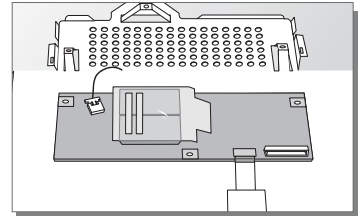
MODEL: LC320W01-B6K1



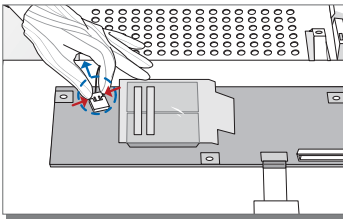
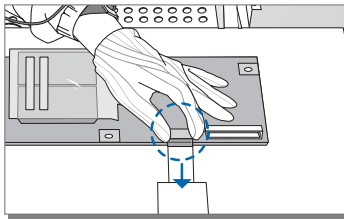
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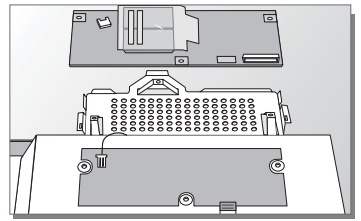
2 Separate the Screw(3EA).



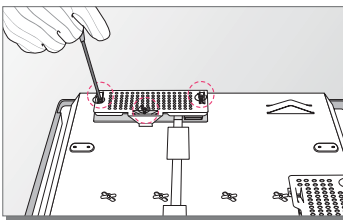
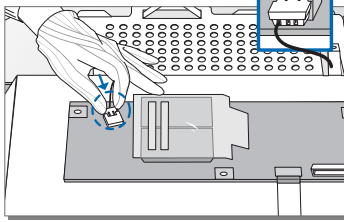
3 Separate the Cover Shield.

4 Unlock of Connector and
separate the Wire Connector(2pin).

5 Separate the FFC(8pin).



6 Separate the Inverter.

9 Attach the Cover Shield and
Assemble the Screw(3EA).

8 Assemble the Wire Connector(2pin).

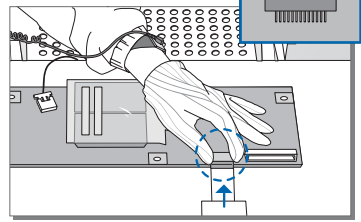
7 Replace of Inverter and
Assemble the FFC(8pin).H_16890_026.eps
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Figure 4-7 Replacement instructions Inverter (master) board

4.3.3 Inverter (Slave) Board

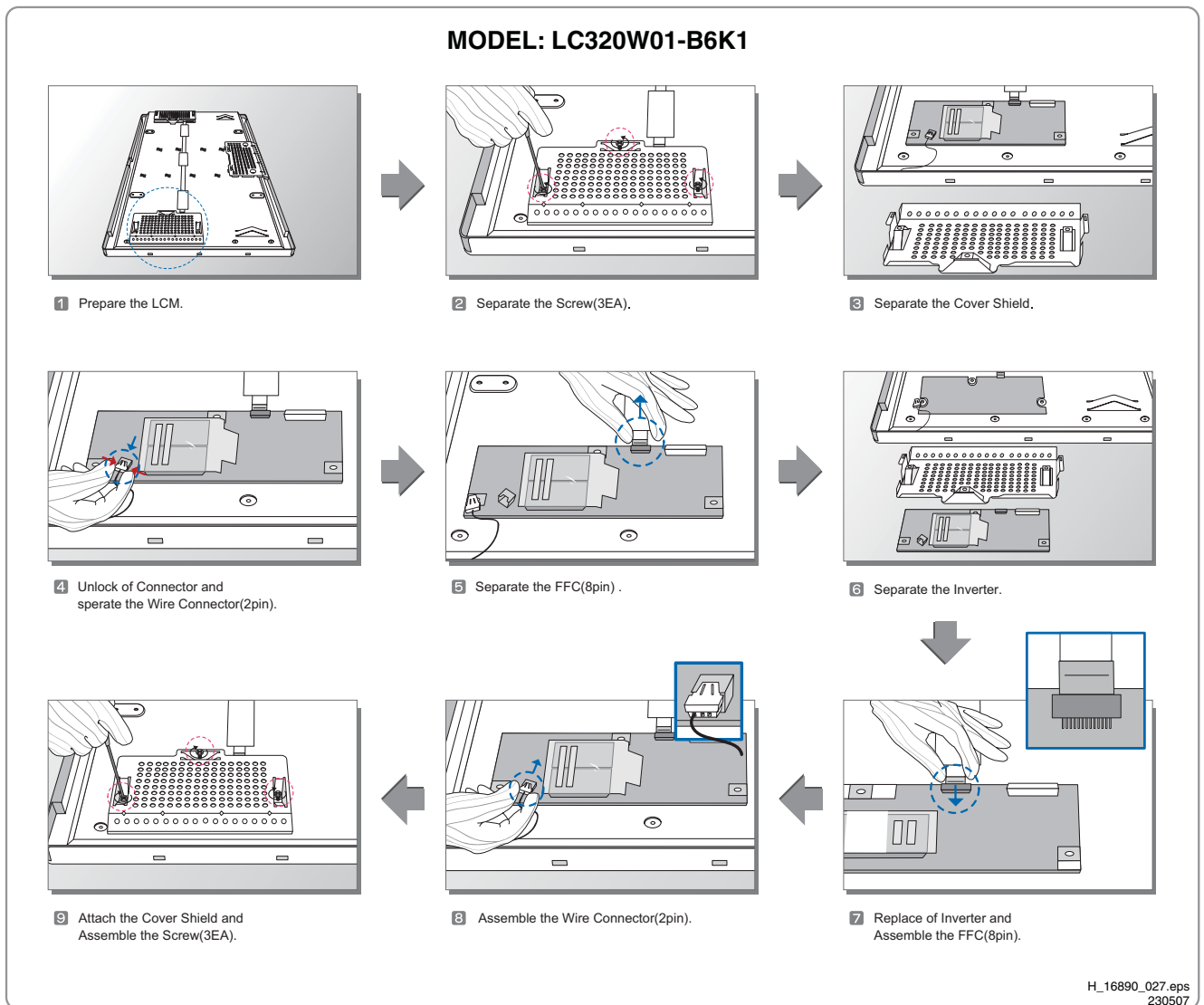
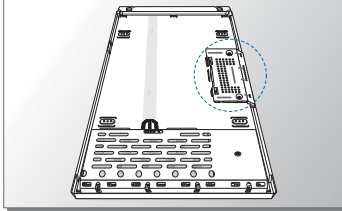


Figure 4-8 Replacement instructions Inverter (slave) board

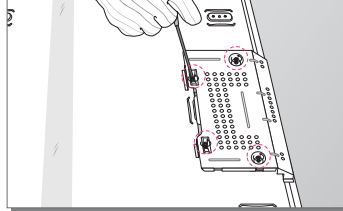
4.4 Model LC320WX2

4.4.1 Control Board (T-CON Board)

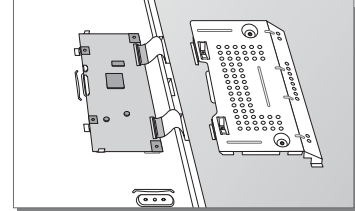
MODEL: LC320WX2-SL01



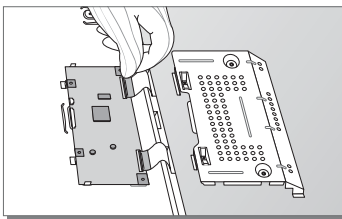
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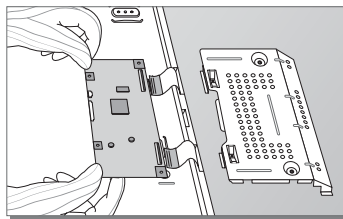
2 Separate the Screw(4EA).



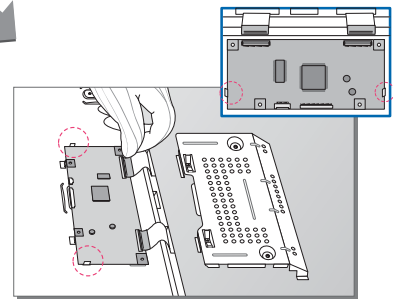
3 Separate the Cover Shield.



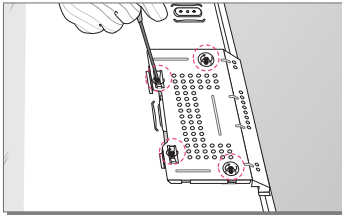
4 Separate the FFC(60pin) 2EA.



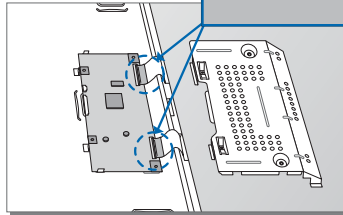
5 Separate the T-CON Board.



6 Replace of T-CON Board and Assemble the FFC(60pin) 4EA.
* Guide Pin station keeping check.



8 Attach the Cover Shield and Assemble the Screw(4EA).



7 Check the FFC(60pin) 4EA.

Figure 4-9 Replacement instructions T-CON board

4.4.2 Inverter Board

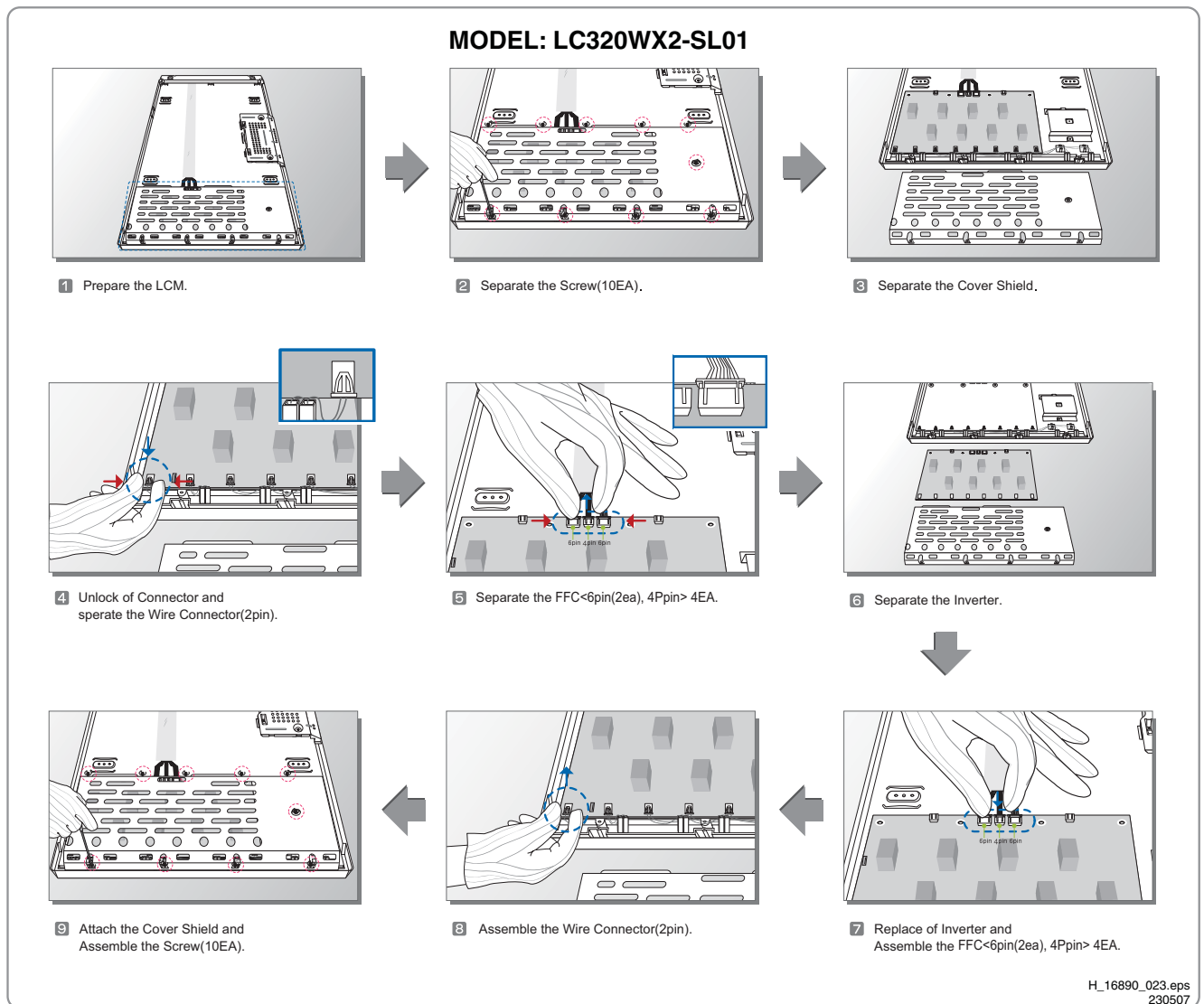
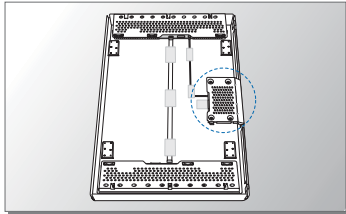


Figure 4-10 Replacement instructions Inverter board

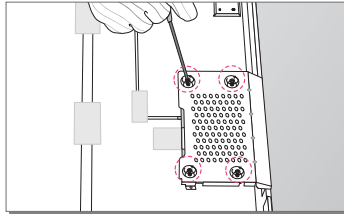
4.5 Model LC420WU2

4.5.1 Control Board (T-CON Board)

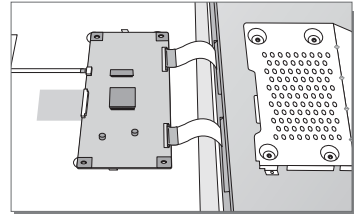
MODEL: LC420WU2-SLC1



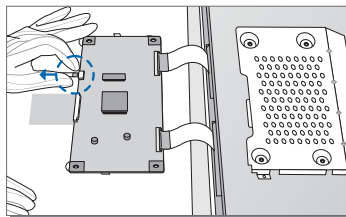
1 Prepare the LCM.



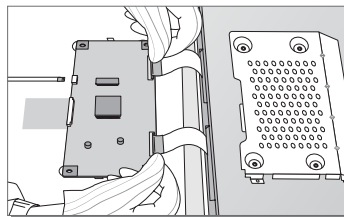
2 Separate the Screw(4EA).



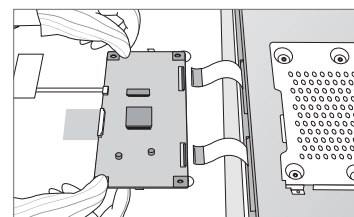
3 Separate the Cover Shield.



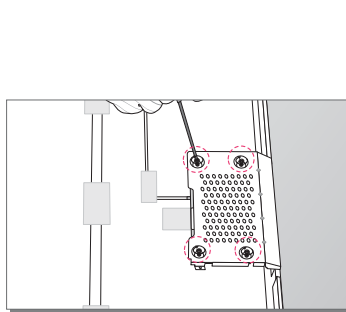
4 Separate the 4pin FFC.



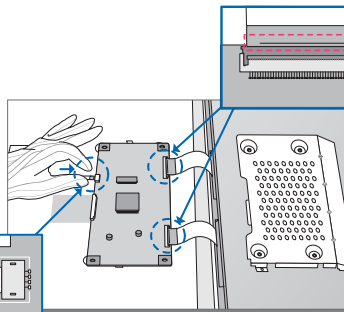
5 Separate the 80pin FFC.



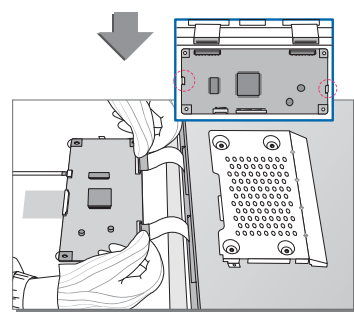
6 Separate the T-CON Board.



7 Replace of T-CON Board and Assemble the 80pin FFC.
* Guide Pin station keeping check.



8 Assemble the 4pin FFC.



9 Attach the Cover Shield and Assemble the Screw(4EA).

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Figure 4-11 Replacement instructions T-CON board

4.5.2 Inverter (Master) Board

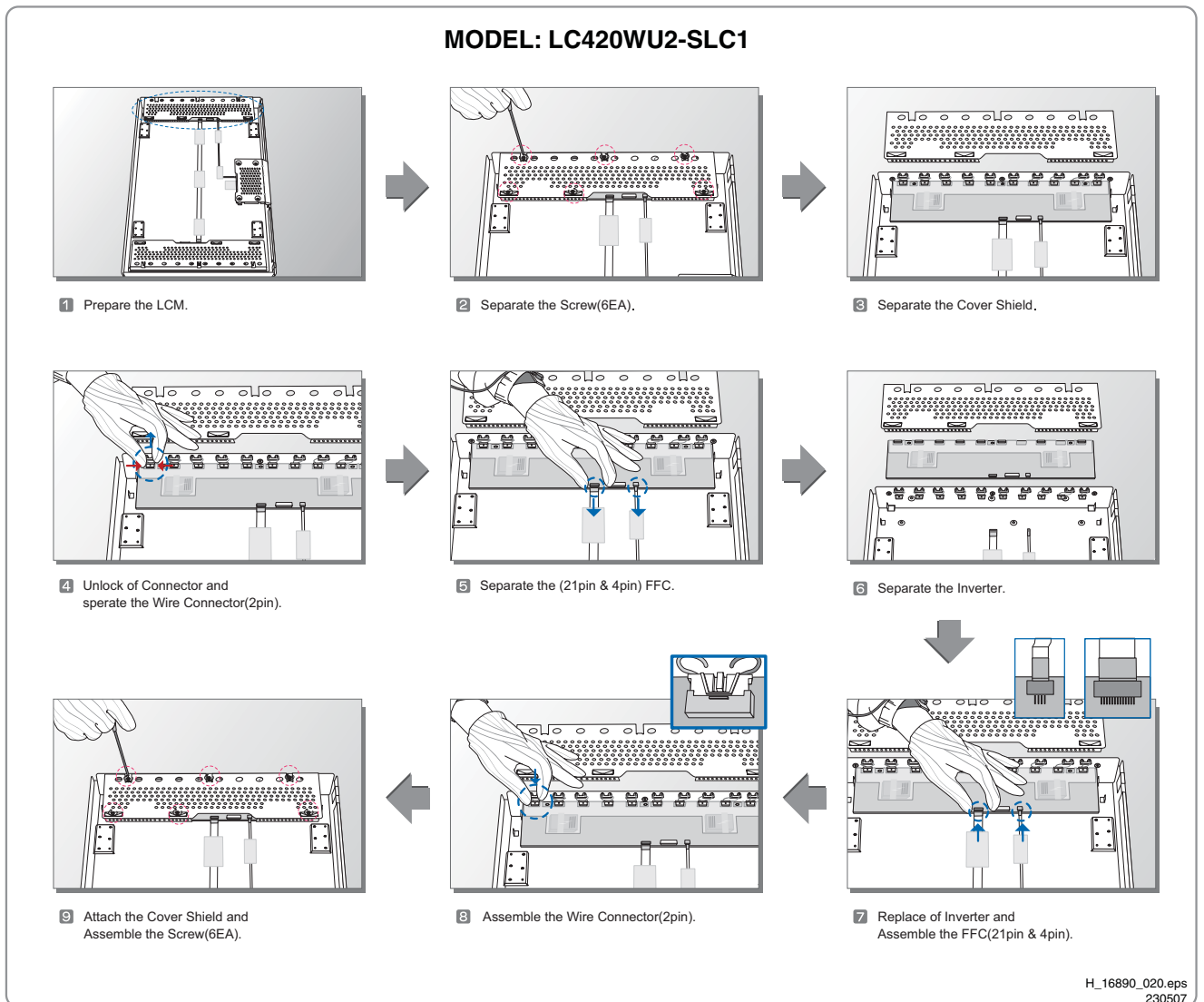
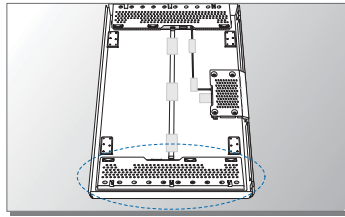


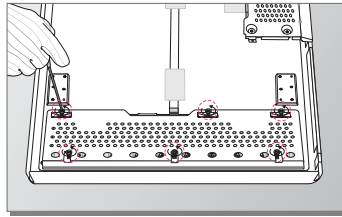
Figure 4-12 Replacement instructions Inverter (master) board

4.5.3 Inverter (Slave) Board

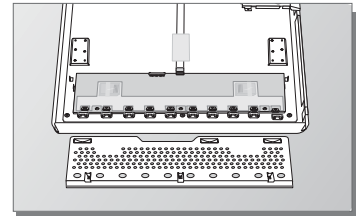
MODEL: LC420WU2-SLC1



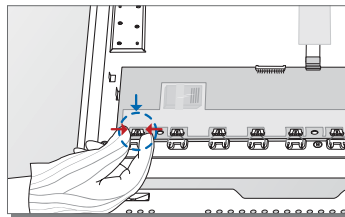
1 Prepare the LCM.



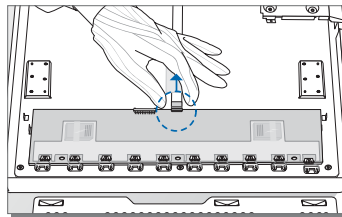
2 Separate the Screw(6EA).



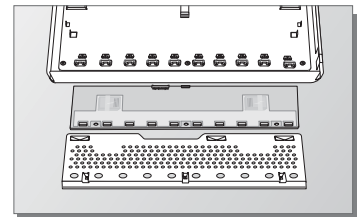
3 Separate the Cover Shield.



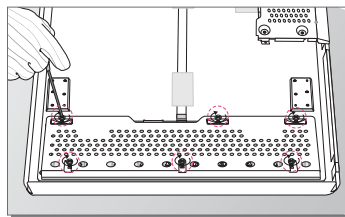
4 Unlock of Connector and separate the Wire Connector(2pin).



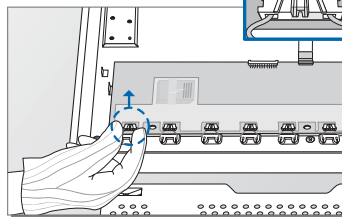
5 Separate the (21pin) FFC.



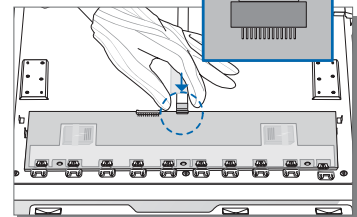
6 Separate the Inverter.



9 Attach the Cover Shield and Assemble the Screw(6EA).



8 Assemble the Wire Connector(2pin).



7 Replace of Inverter and Assemble the FFC(21pin).

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Figure 4-13 Replacement instructions Inverter (slave) board

4.6 Model LC420WX2

4.6.1 Control Board (T-CON Board)

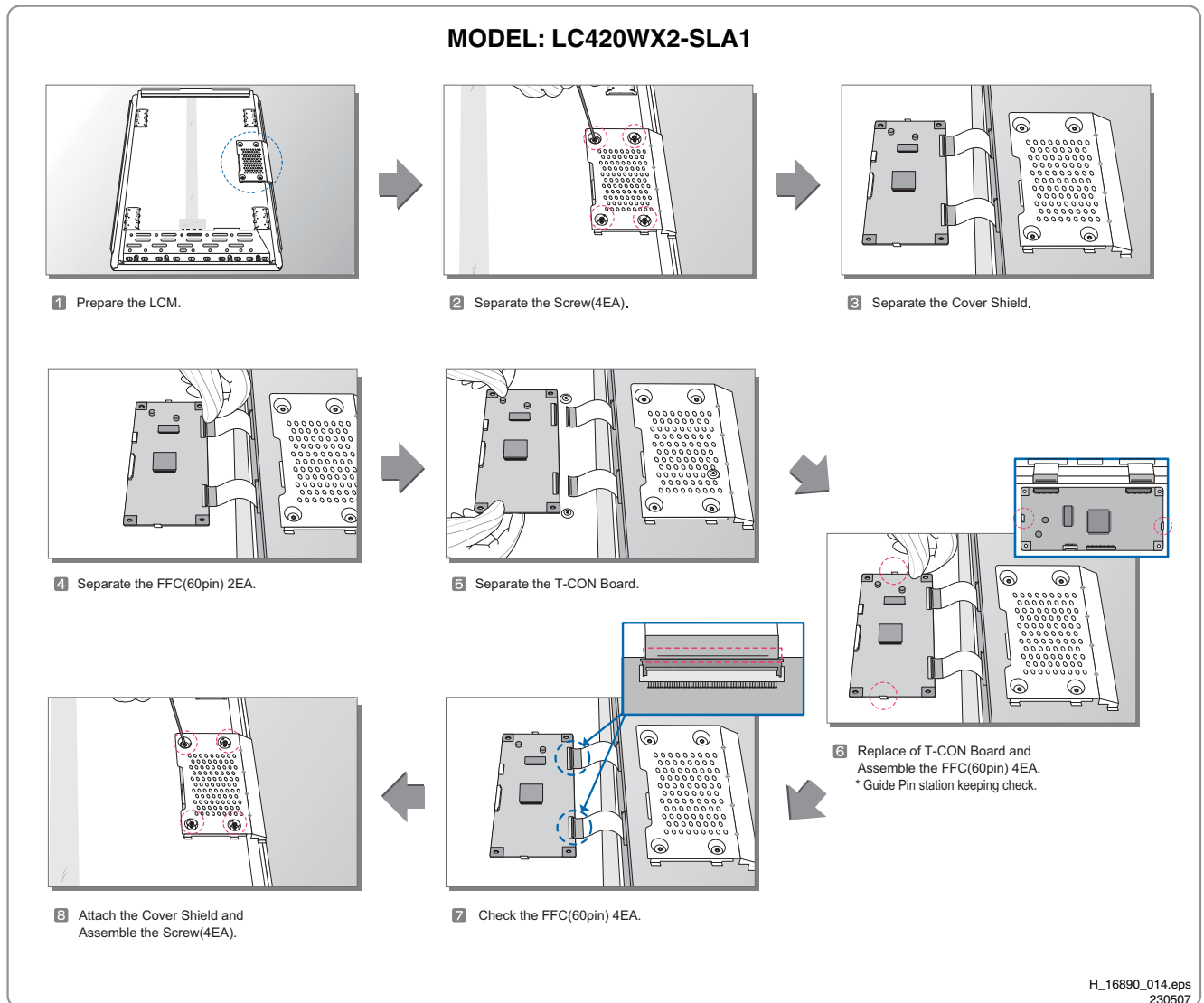
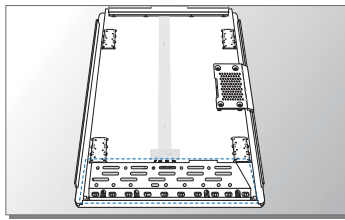


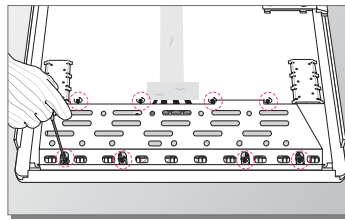
Figure 4-14 Replacement instructions T-CON board

4.6.2 Inverter Board

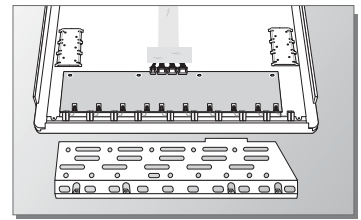
MODEL: LC420WX2-SLA1



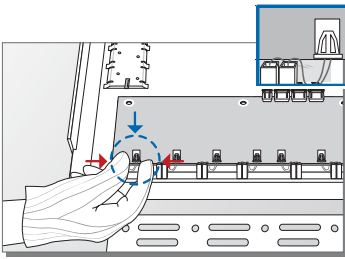
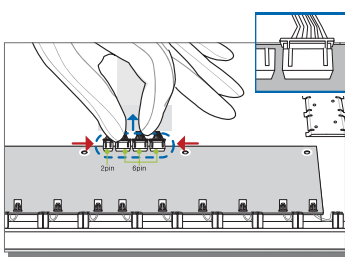
1 Prepare the LCM.



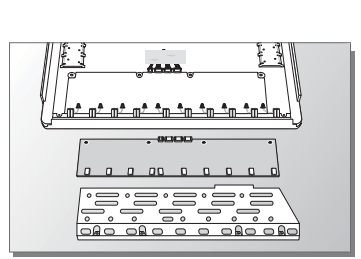
2 Separate the Screw(8EA).



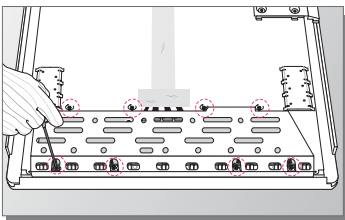
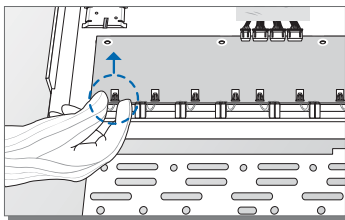
3 Separate the Cover Shield.

4 Unlock of Connector and
separate the Wire Connector(2pin).

5 Separate the FFC<6pin(3ea), 2Ppin> 4EA.



6 Separate the Inverter.

9 Attach the Cover Shield and
Assemble the Screw(8EA).

8 Assemble the Wire Connector(2pin).

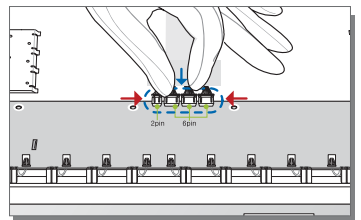
7 Replace of Inverter and
Assemble the FFC<6pin(3ea), 2Ppin> 4EA.H_16890_015.eps
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Figure 4-15 Replacement instructions Inverter board

4.7 Model LC420WX3

4.7.1 Control Board (T-CON Board)

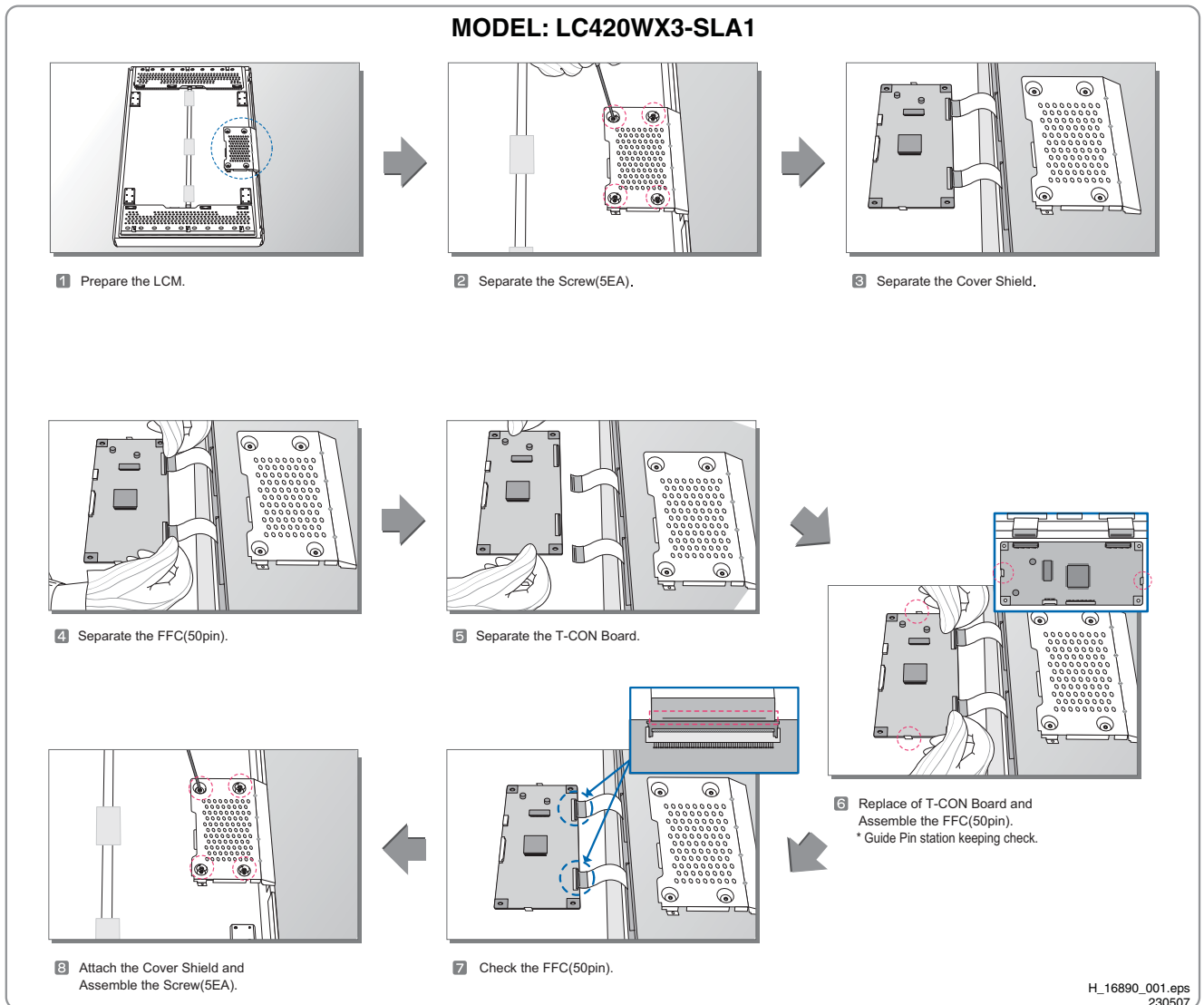


Figure 4-16 Replacement instructions T-CON board

4.7.2 Inverter (Master) Board

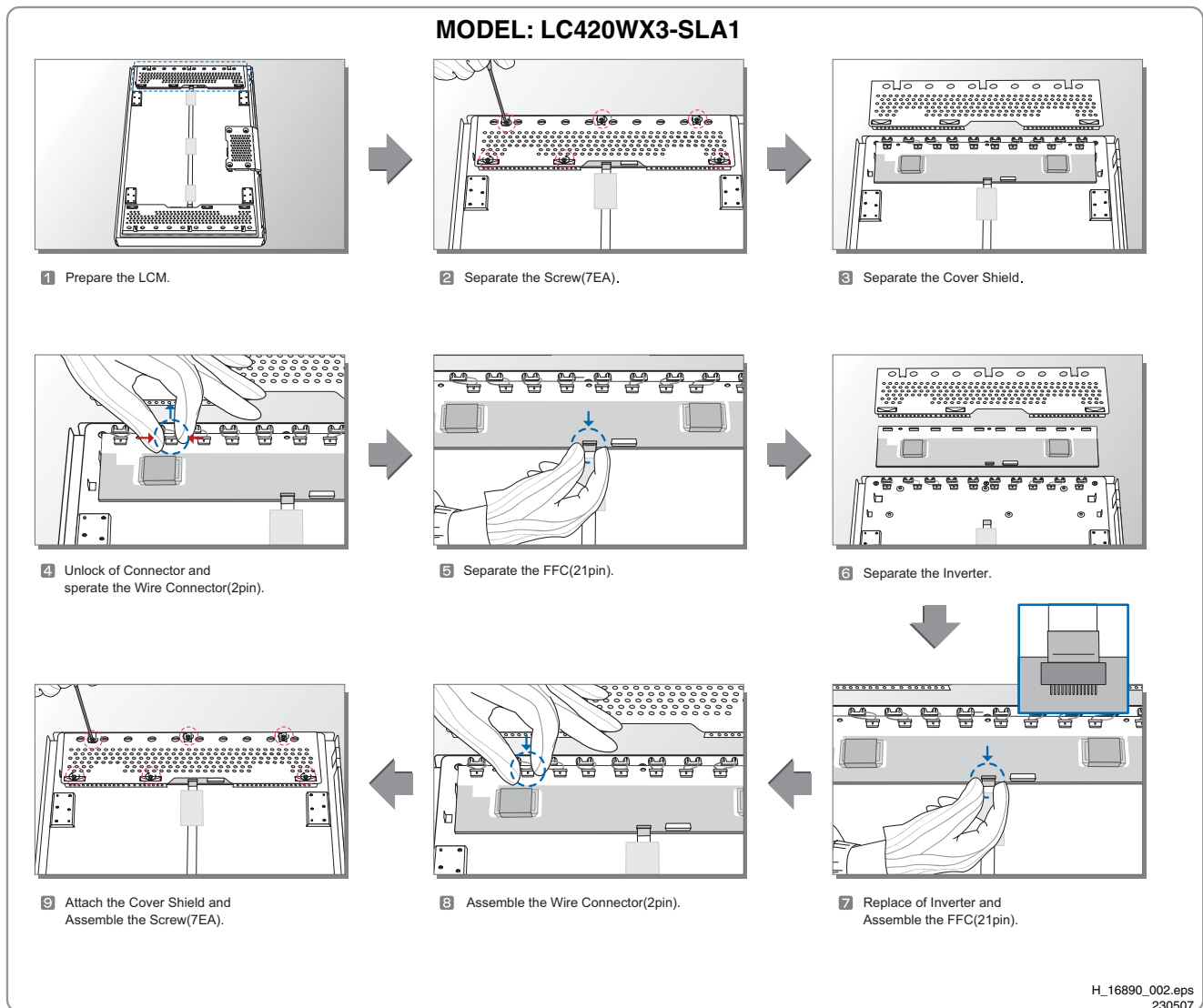


Figure 4-17 Replacement instructions Inverter (master) board

4.7.3 Inverter (Slave) Board

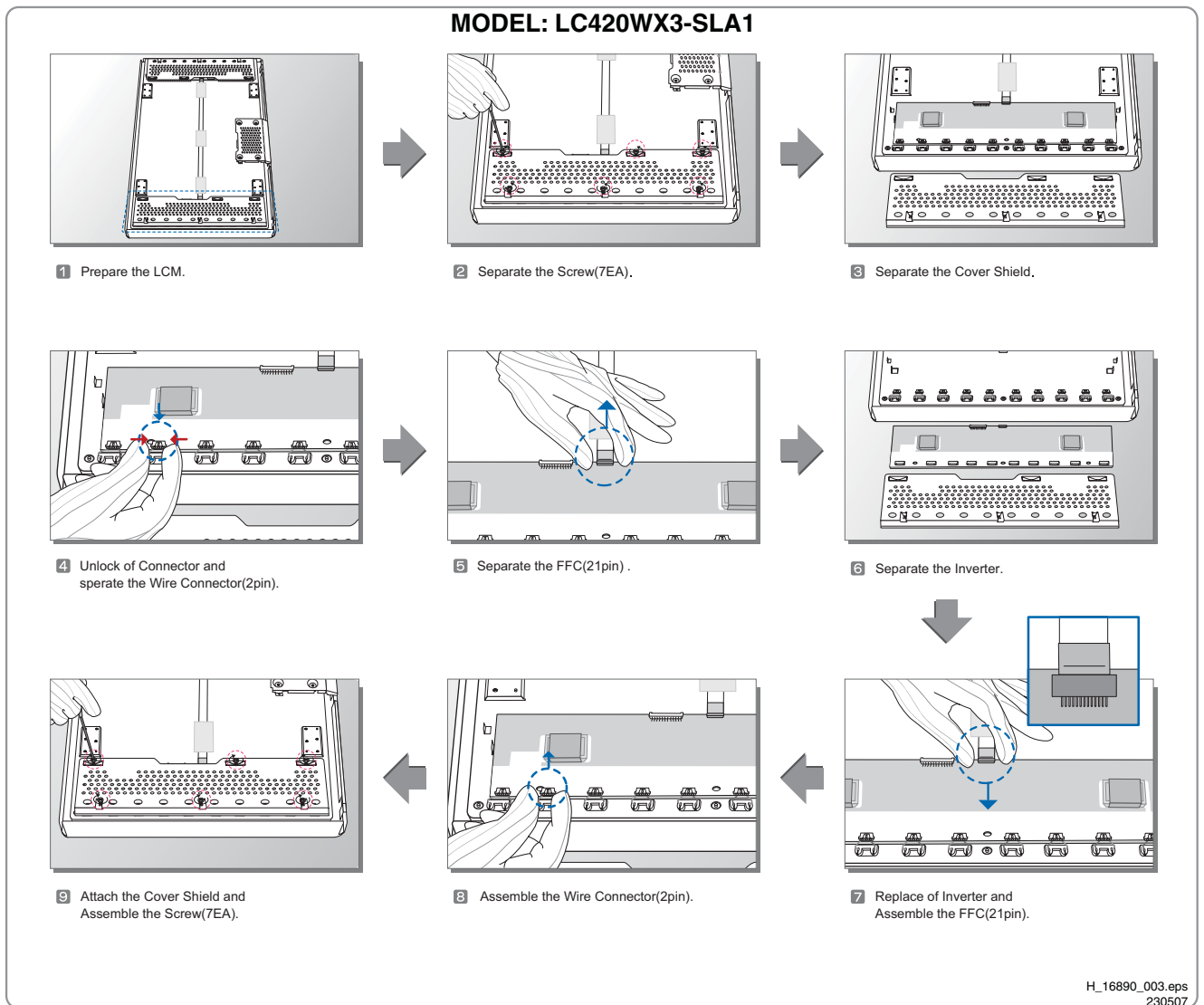


Figure 4-18 Replacement instructions Inverter (slave) board

4.8 Model LC420WX5

4.8.1 Control Board (T-CON Board)

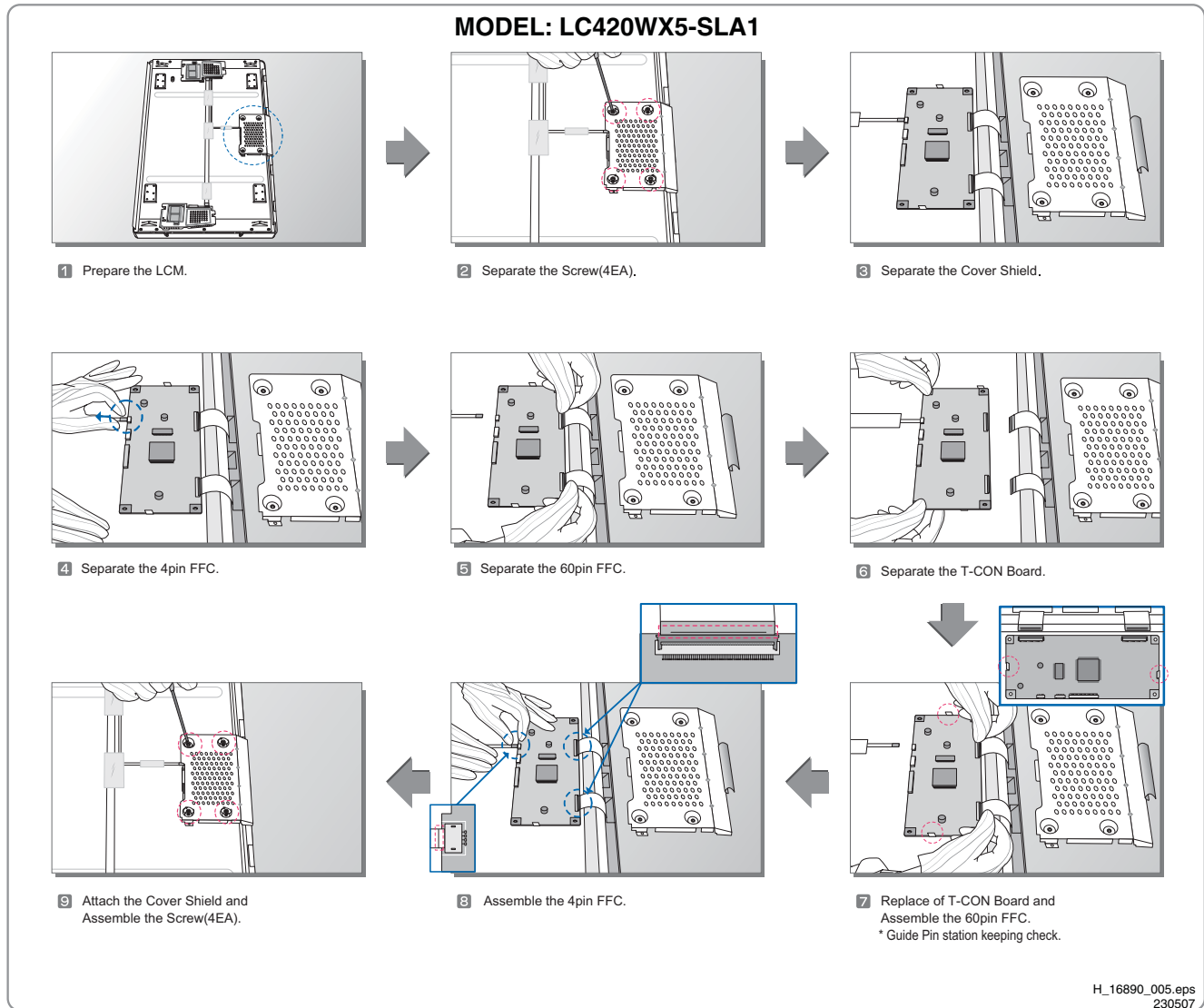


Figure 4-19 Replacement instructions T-CON board

4.8.2 Inverter (Master) Board

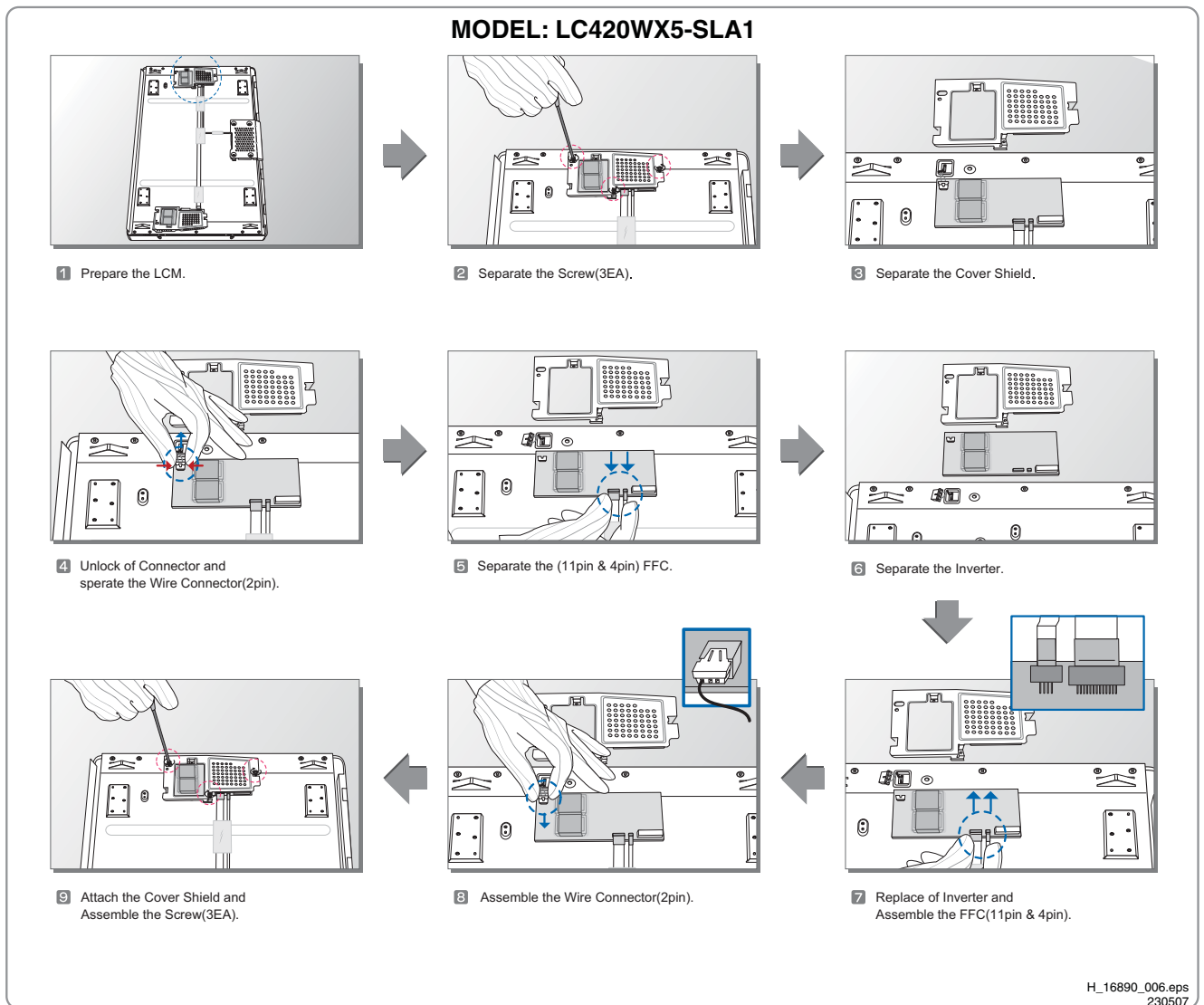


Figure 4-20 Replacement instructions Inverter (master) board

4.8.3 Inverter (Slave) Board

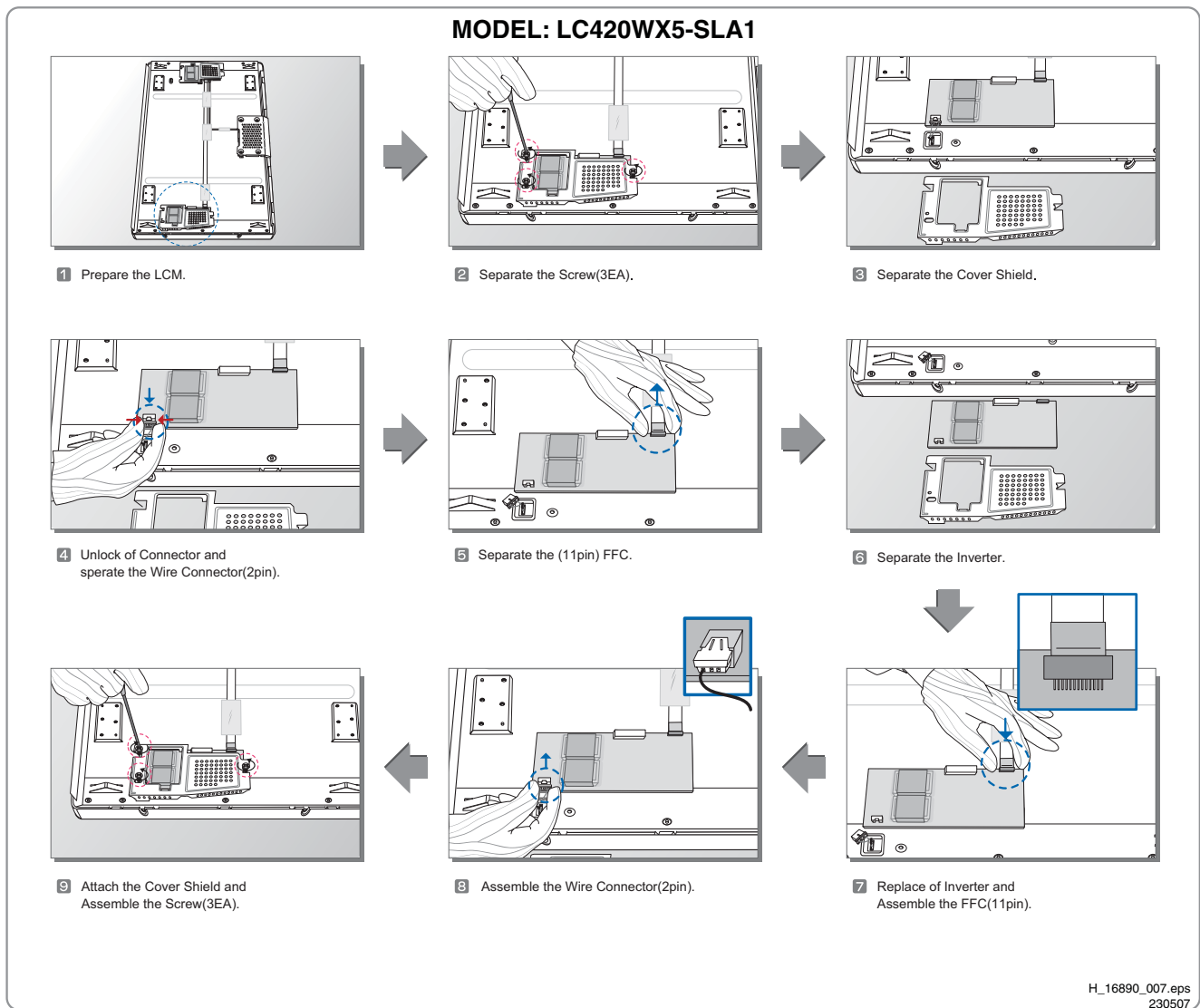


Figure 4-21 Replacement instructions Inverter (slave) board

4.9 Model LC470WU1

4.9.1 Control Board (T-CON Board)

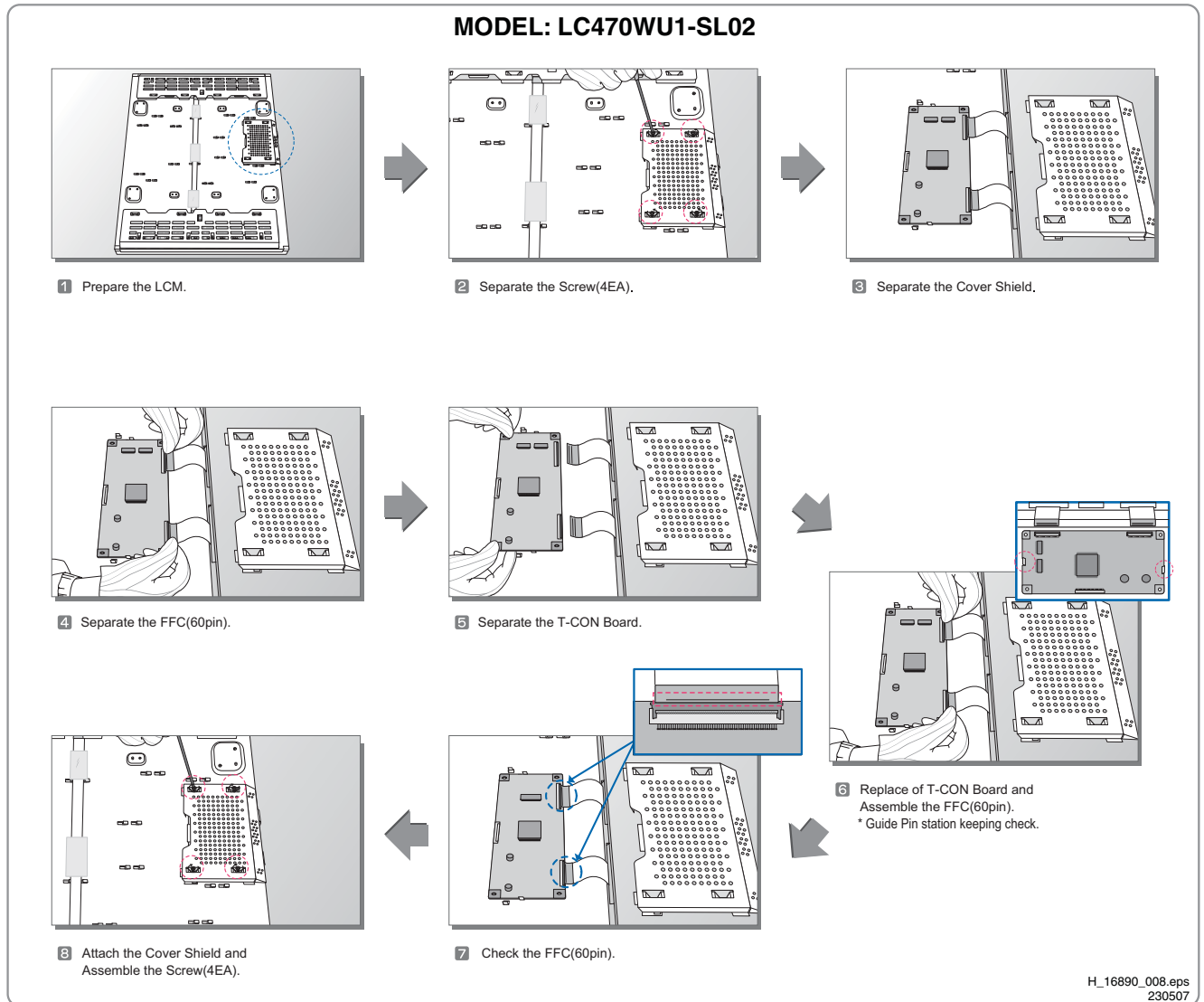


Figure 4-22 Replacement instructions T-CON board

4.9.2 Inverter (Master) Board

MODEL: LC470WU1-SL02

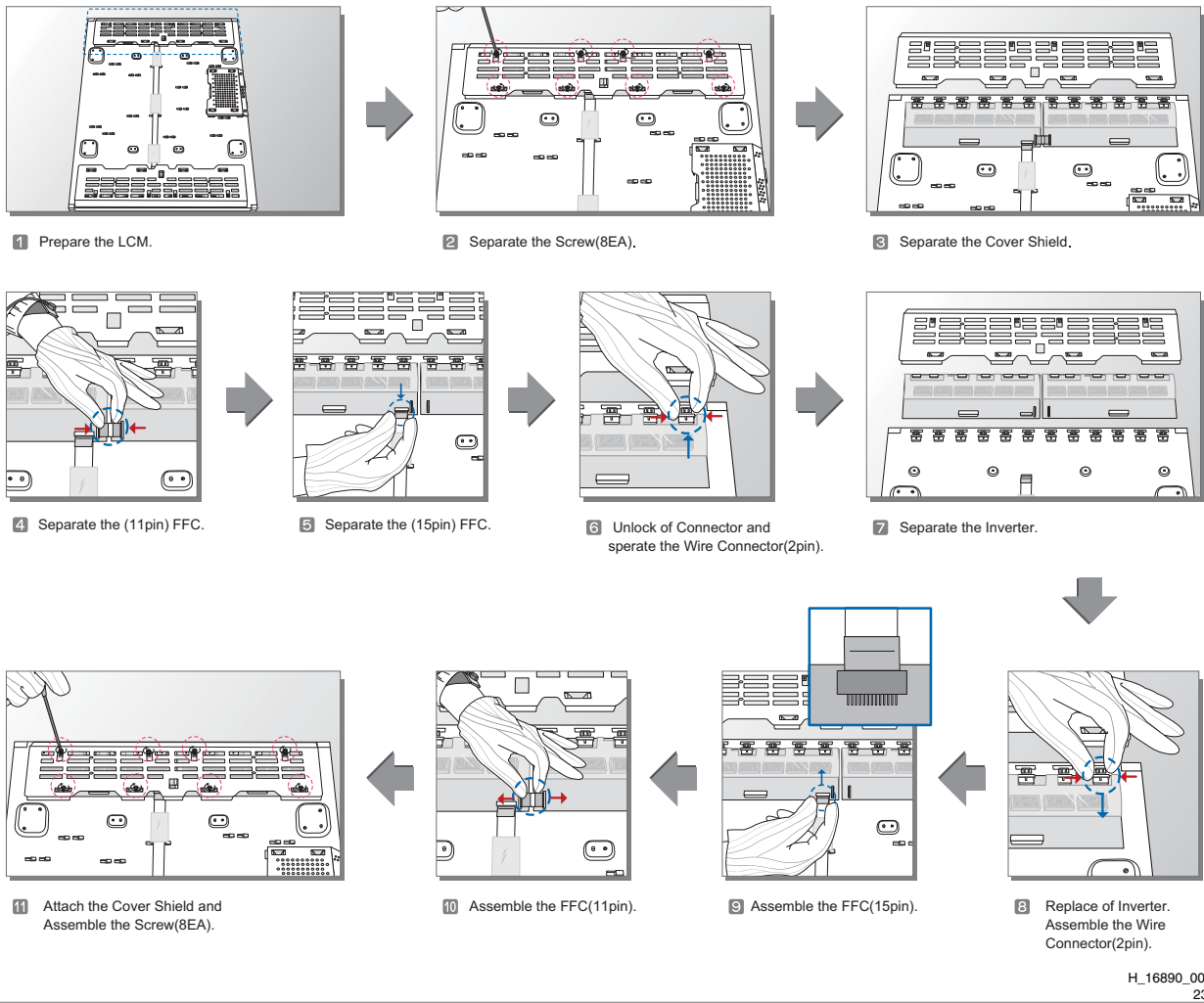


Figure 4-23 Replacement instructions Inverter (master) board

4.9.3 Inverter (Slave) Board

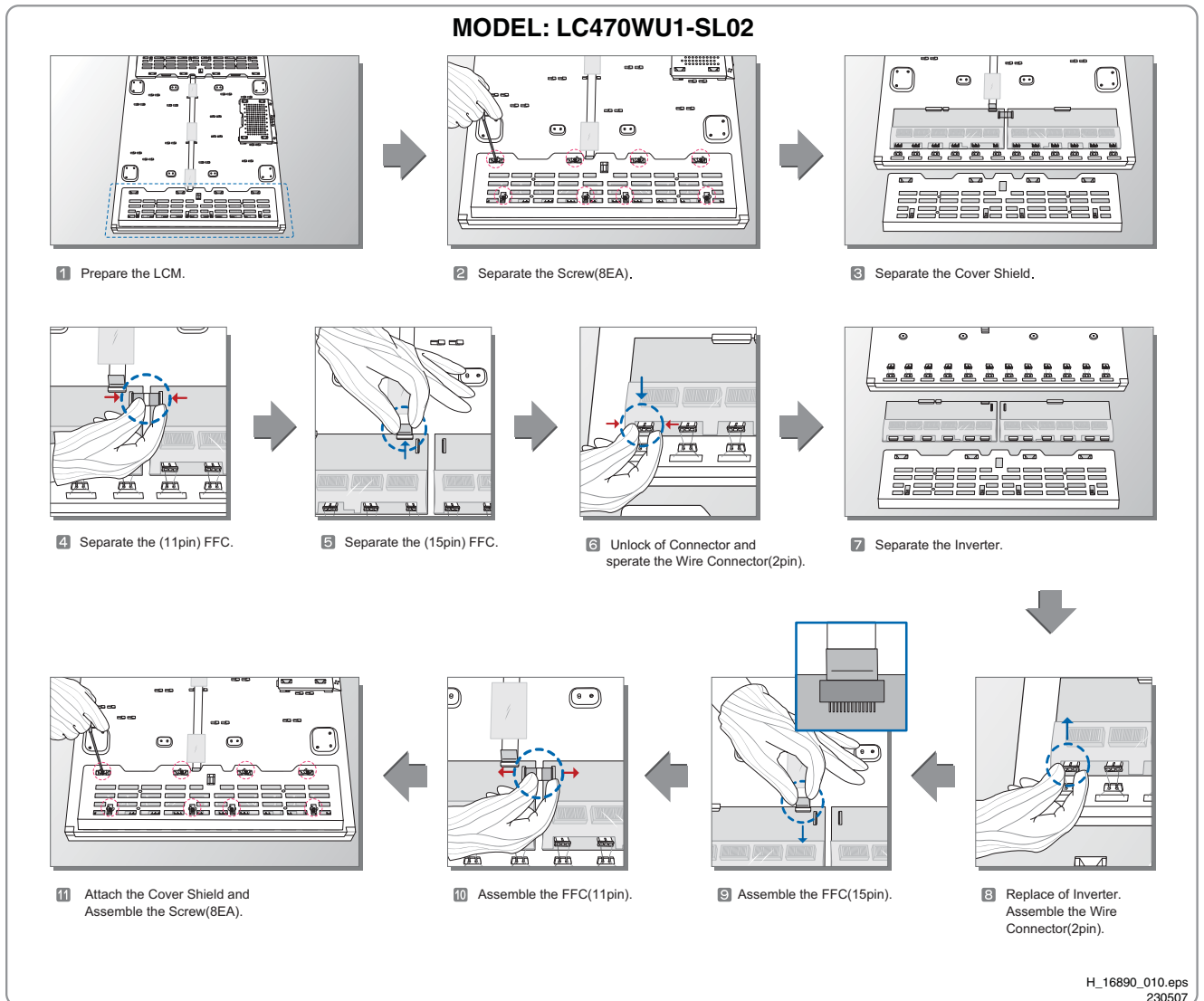
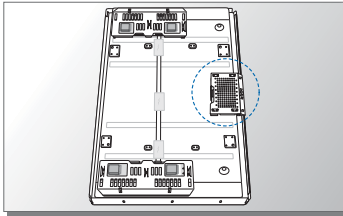


Figure 4-24 Replacement instructions Inverter (slave) board

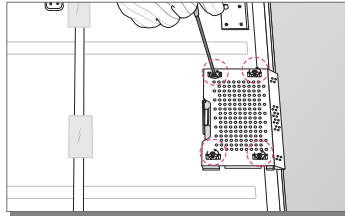
4.10 Model LC470WU4

4.10.1 Control Board (T-CON Board)

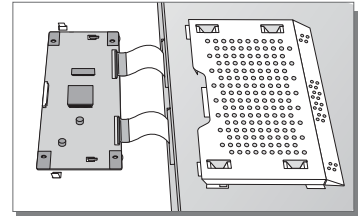
MODEL: LC470WU4-SLA2



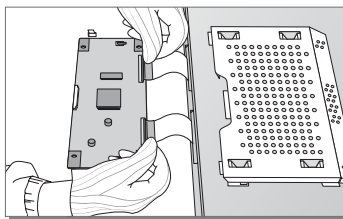
1 Prepare the LCM.



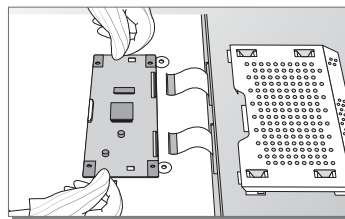
2 Separate the Screw(4EA).



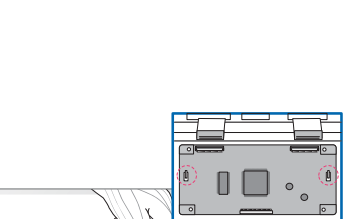
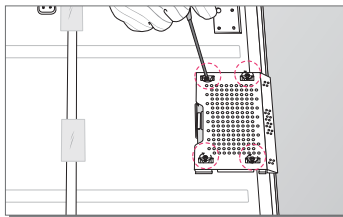
3 Separate the Cover Shield.



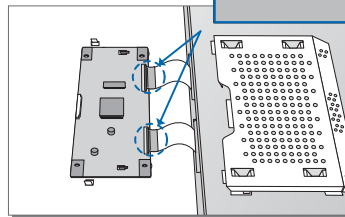
4 Separate the FFC(80pin).



5 Separate the T-CON Board.

6 Replace of T-CON Board and Assemble the FFC(80pin).
* Guide Pin station keeping check.

8 Attach the Cover Shield and Assemble the Screw(4EA).



7 Check the FFC(80pin).

Figure 4-25 Replacement instructions T-CON board

4.10.2 Inverter (Master) Board

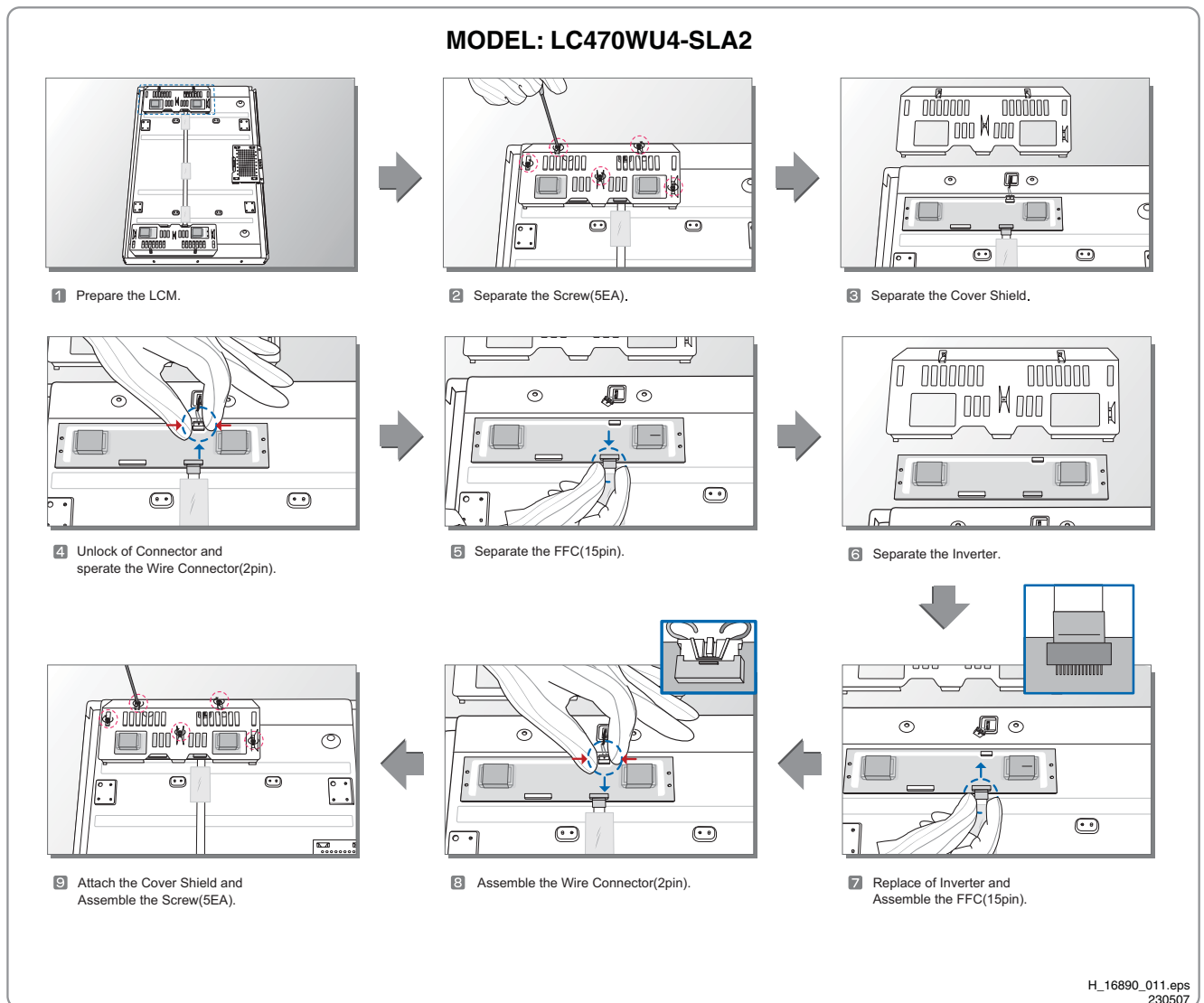
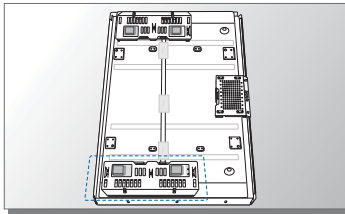


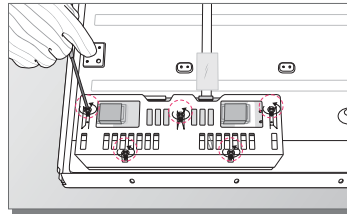
Figure 4-26 Replacement instructions Inverter (master) board

4.10.3 Inverter (Slave) Board

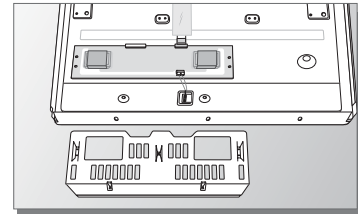
MODEL: LC470WU4-SLA2



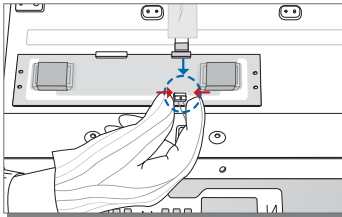
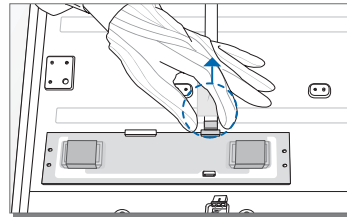
1 Prepare the LCM.



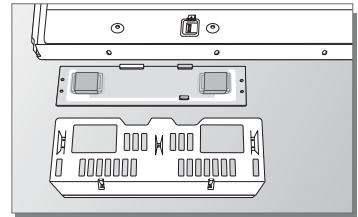
2 Separate the Screw(5EA).



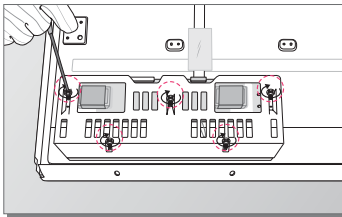
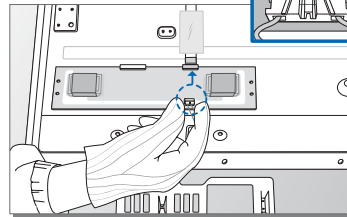
3 Separate the Cover Shield.

4 Unlock of Connector and
separate the Wire Connector(2pin).

5 Separate the FFC(15pin) .



6 Separate the Inverter.

9 Attach the Cover Shield and
Assemble the Screw(5EA).

8 Assemble the Wire Connector(2pin).

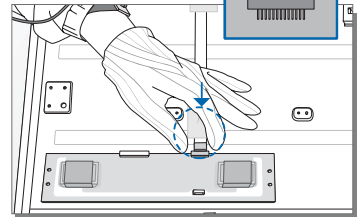
7 Replace of Inverter and
Assemble the FFC(15pin).H_16890_013.eps
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Figure 4-27 Replacement instructions Inverter (slave) board

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

- 5.1 Service Modes
- 5.2 Error Codes
- 5.3 Fault Finding

5.1 Service Modes

Not applicable.

5.2 Error Codes

Not applicable.

5.3 Fault Finding

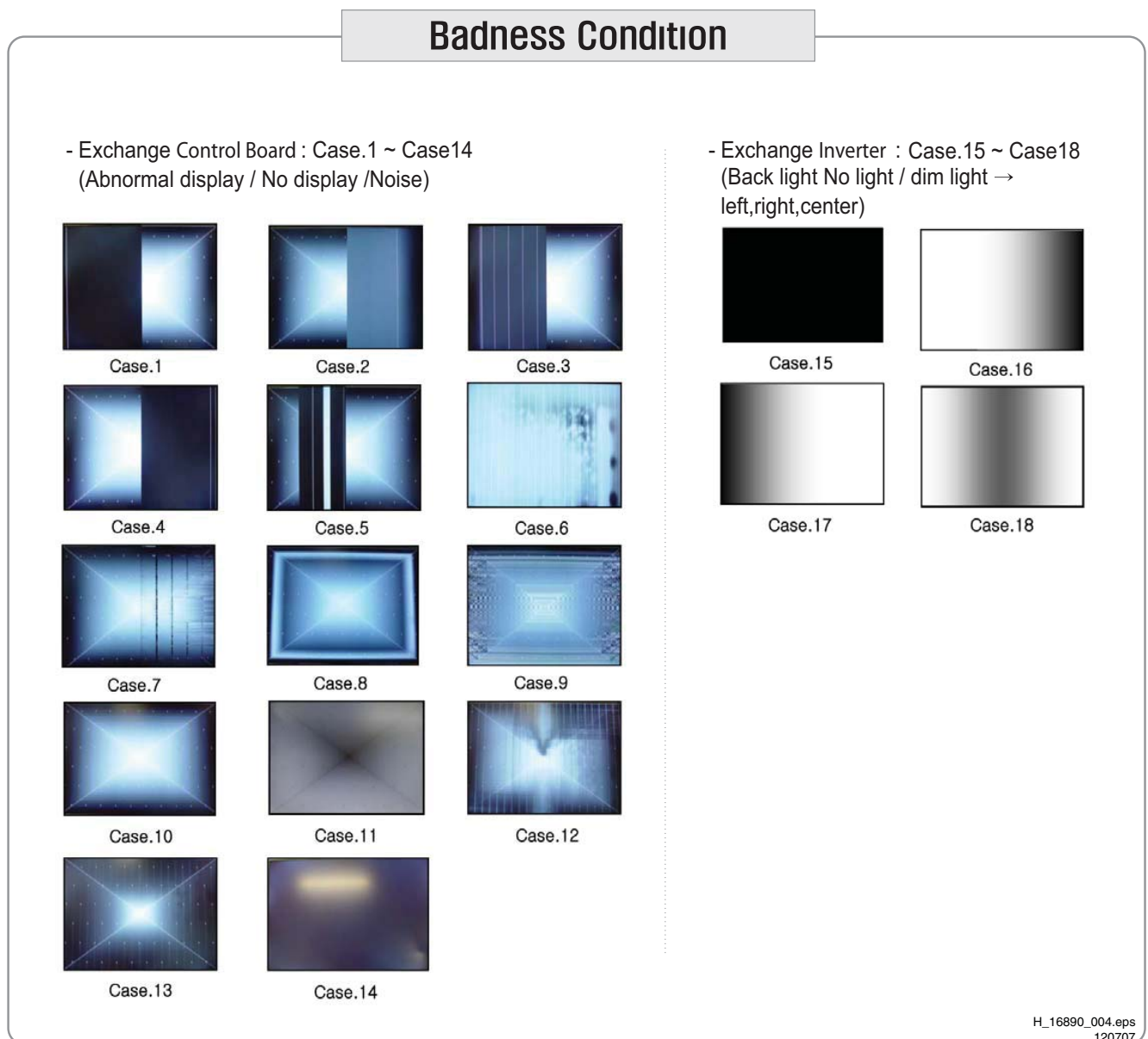


Figure 5-1 Symptom/Cure overview

6. Block Diagrams, Test Point Overviews, and Waveforms

Not applicable.

7. Circuit Diagrams and PWB Layouts

Not applicable

8. Alignments

Not applicable.

9. Circuit Descriptions, Abbreviation List, and IC Data Sheets

9.1 Circuit Descriptions

Not applicable

9.2 Abbreviation List

| | |
|------|-------------------------------------|
| AUO | Acer Unipack Optronics (supplier) |
| CCFL | Cold Cathode Fluorescent Lamp |
| CMO | Chi Mei Optronics (supplier) |
| COF | Chip On Flex / Foil / Film |
| CPT | Chunghwa Picture Tubes (supplier) |
| DC | Direct Current |
| FET | Field Effect Transistor |
| FFC | Flat Foil Cable |
| FPC | Flexible Printed Circuit |
| IC | Integrated Circuit |
| LCD | Liquid Crystal Display |
| LCM | Liquid Crystal Module |
| LED | Light Emitting Diode |
| LPL | LG Philips LCD (supplier) |
| PCB | Printed Circuit Board (same as PWB) |
| PSU | Power Supply Unit |
| PWB | Printed Wiring Board (same as PCB) |
| RGB | Red, Green, Blue colour space |
| TCP | Tape Carrier Package |

9.3 IC Data Sheets

Not applicable

10. Spare Parts List

Please refer to the Philips Service website, for an actual overview (monthly updated).

11. Revision List

Manual xxxx xxx xxxx.0

- First release.